Adapting DIS-Based Simulators to HLA

CCTT SAF

Peter A. Berggren

Wesley Braudaway, Ph.D.

Description of the Effort

- Sponsor: Colonel Shiflett, PM-CATT
- Implementers: SAIC and Lockheed-Martin via ADST-II Program
- Purpose
  - Provide Feedback to DMSO and AMG Regarding HLA Baseline Development
  - Chart Course for Adapting CCTT to HLA
- Schedule of Completion
  - Report Delivered to STRICOM on 9/16/96
  - Follow-On Tasks In Progress

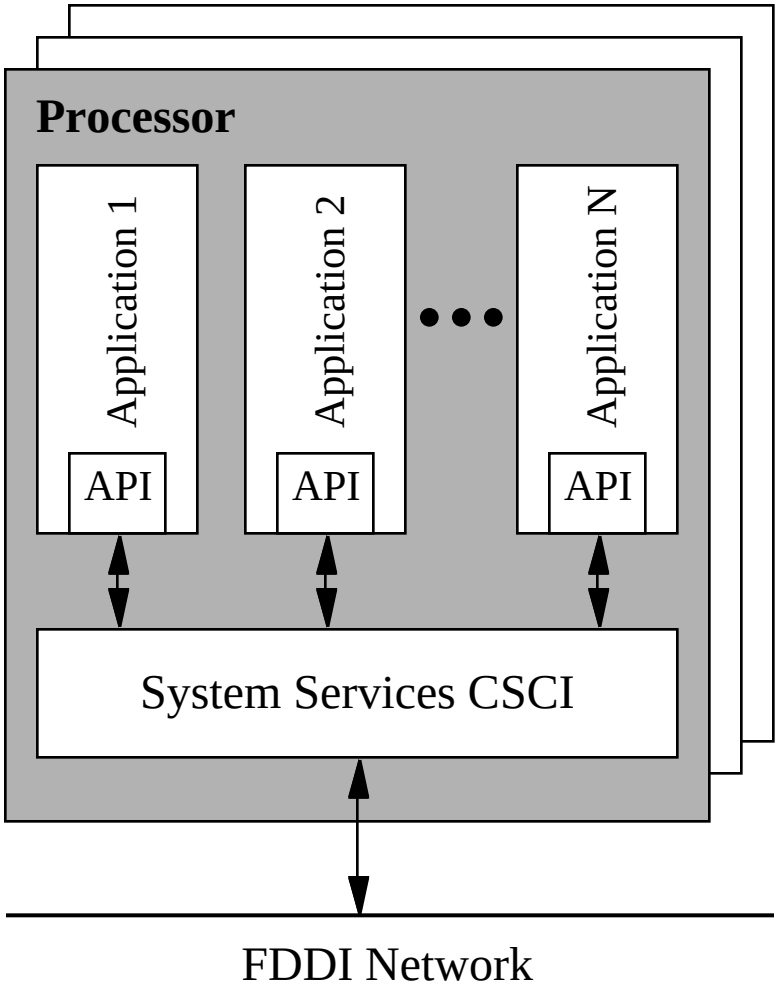
Objectives of the Effort
- Issues Addressed -

- What Is Required to Adapt CCTT to HLA?
  - What Is the Best Technical Approach for Integrating the RTI Into the CCTT Infrastructure?
  - How Many Equivalent SLOC Are Required?
- Can an HLA-Compliant RTI Replace the Existing CCTT Network Software?
- What Is the Performance of the HLA Version of CCTT SAF?
  - Latency
  - CPU and Memory Consumption

Objectives of the Effort
- Tasks Performed -

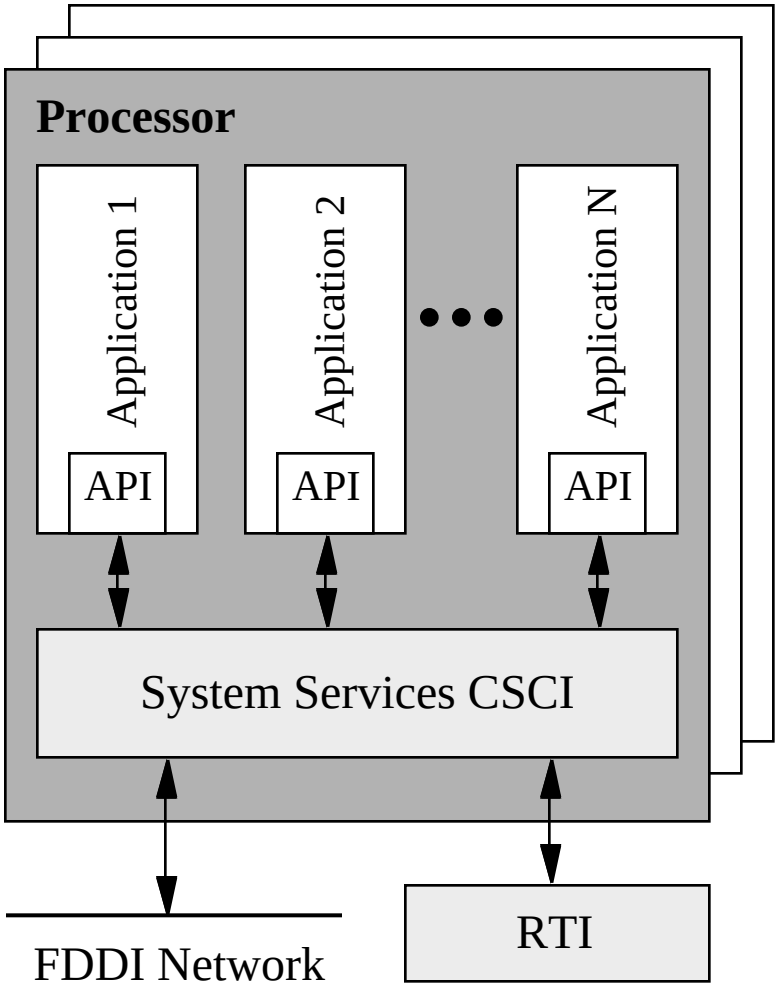
- Support Development of the Platform Proto-Federation (PPF)
- Integrate the RTI into CCTT SAF
- Establish Terrain Correlation with Other Members of PPF
- Execute the PPF Experiments Using the HLA Version of CCTT SAF
  - Self-Federate
  - Mixed-Federate
- Prepare Lessons Learned Report(s)

Implementation Methodology
- Starting Point -



- CCTT is a Collection of ***Processors***
- Each Processor:
  - Is Connected to the FDDI Network
  - Contains One Instance of the ***System Services CSCI***
  - Supports a Collection of One or More ***Applications***
- Applications Talk to System Services Via an API

Implementation Methodology
- What Changed -



- Modified System Services CSCI
  - Send and Receive Entity State Data via RTI
  - Translate Fire, Detonate, and Collision PDUs To/ From FOM Interactions
- Rationale
  - Enables Use of RTI Features
  - Limits Impact on Existing CCTT Applications

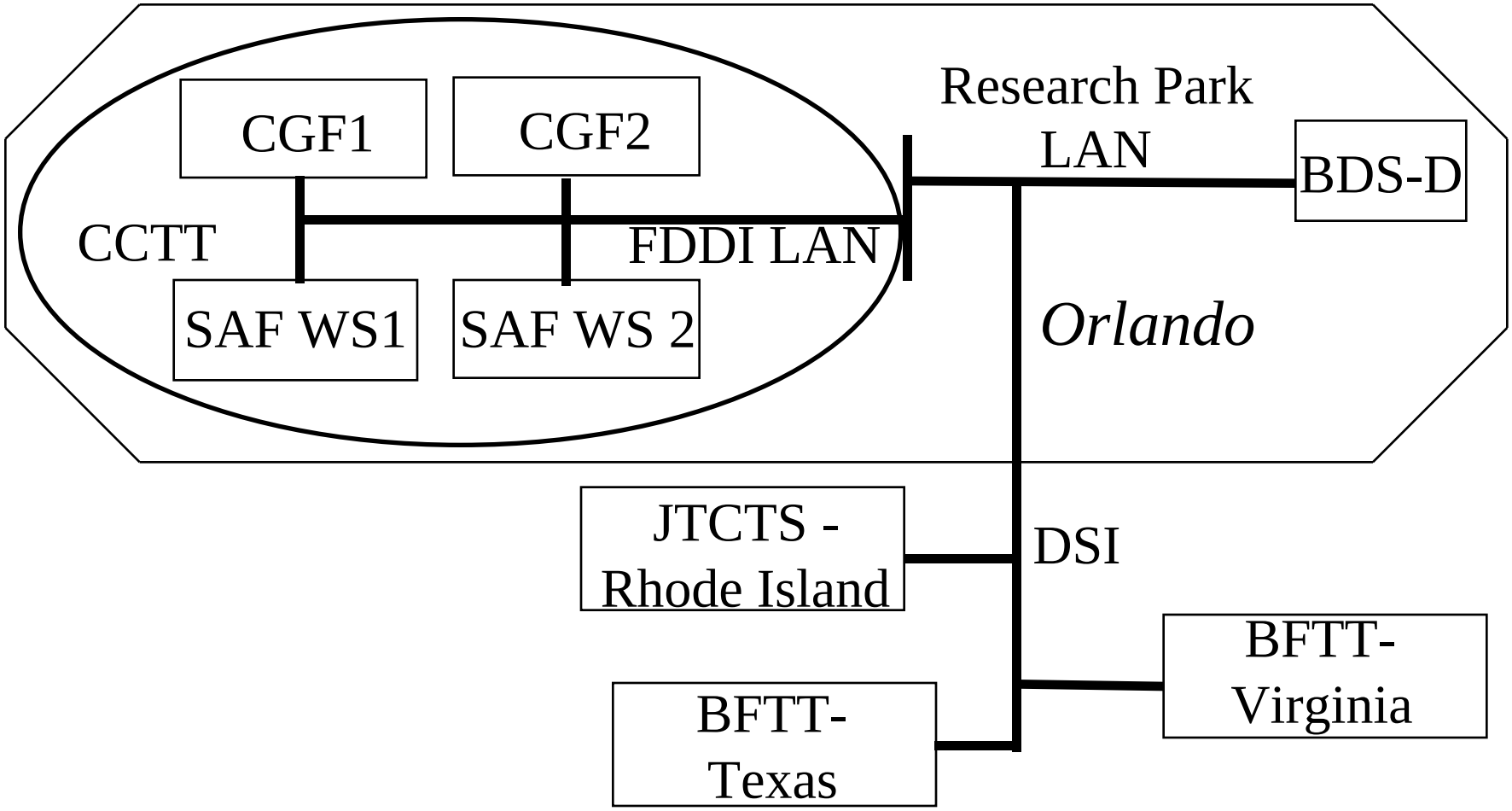
Implementation Methodology
- Long-Term Goals -

- Completely Replace Existing CCTT Network Software with HLA-Compliant RTI
  - Reduce Software Maintenance Costs
  - Improve Portability of CCTT Software with Respect to Operating System and Network Protocol
- Exploit HLA Features on a Case-By-Case Basis
- Federate with:
  - WARSIM 2000
  - Other Members of CATT Family

Resources Required
- Approximate -

- 5,000 SLOC to Integrate RTI Into CCTT SAF for PPF Experiment
- $770,000 for Participation of CCTT SAF in PPF
  - Includes All Tasks Listed on Slide 4
- $150,000 to Integrate RTI into CCTT SAF for PPF Experiment
- We Estimate 27,200 SLOC to Completely Replace Existing CCTT Network Software with HLA-Compliant RTI
  - Does Not Include System Regression Test or Site Upgrades

PPF Network


CGF1
CGF2
Research Park
LAN
BDS-D
CCTT
FDDI LAN
SAF WS1
SAF WS 2
Orlando
JTCTS -
Rhode Island
DSI
BFTT-
Virginia
BFTT-
Texas

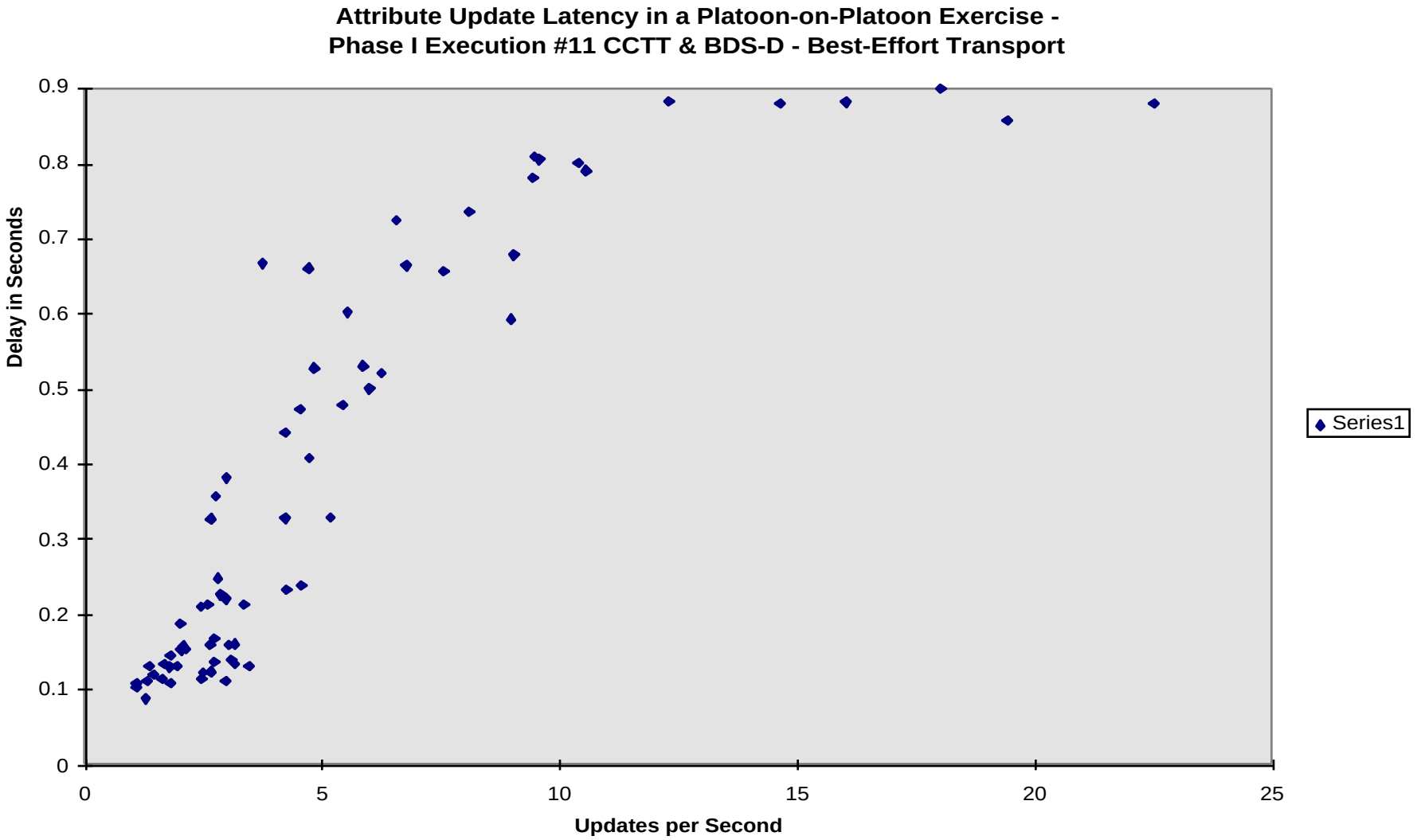
Lessons Learned
- What Worked -

- Performance
  - CPU and Memory Consumption Was Acceptable, With the Following Caveats:
    - Process Priorities Must Be Tuned
    - RTI Executive Must Run on Its Own Processor
  - HLA Version of CCTT SAF Generated 60% Fewer Updates/Second Than DIS Version
- Functionality of RTI Prototype 0.3X is Adequate for PPF Experiment
- HLA Provides Formalism for Building Interoperable Systems

Lessons Learned
- What Didn't Work -

- Performance
  - Latency of Attribute Updates Was Grossly Unacceptable for CCTT
  - (See Next Slide)
- Functionality - No Significant Issues
- Other
  - Object Model Template Should Place More Emphasis On Behavior
    - Include Event Traces?
  - Standard Ada 95 API is Needed

Lessons Learned
- Latency of RTI Prototype 0.3X -



Lessons Learned
- What Wasn't Tested -

- Capacity
- Data Distribution Services
- Replacement of Other DIS Functions
  - Radio
  - Simulation Management
  - Environment
  - Command and Control
  - Etc.
- Multiple, Simultaneous Federation Executions

Future Use

- Follow-On Activities
  - Support Development of Ada 95 API
  - Modify CCTT SAF
    - Use Ada 95 API
    - Implement Selected C2 Interactions Via RTI
    - Integrate with RTI F.0
  - Conduct Experiment with CCTT SAF and ModSAF
- Points of Contact
  - MAJ John Norwood, norwoodj@stricom.army.mil
  - Peter Berggren, peter.a.berggren@cpmx.saic.com
  - Wes Braudaway, wesley.braudaway@cpmx.saic.com